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OCCASION

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RECP Experiences at Carnex Meat Industry Vrbas

The efficient and environmentally sound use of materials, energy and water - coupled with the minimization of waste and emissions - makes good business sense. Resource Efficient and Cleaner Production (RECP) is a way to achieve this in a holistic and systematic manner. RECP covers the application of preventive management strategies that increase the productive use of natural resources, minimize generation of waste and emissions, and foster safe and responsible production. Benefits are eminent in many enterprises, regardless of sector, location or size, as demonstrated by the experiences of Carnex Meat Industry, Serbia.

Achievements at a Glance

The Resource Efficient and Cleaner Production (RECP) project in Carnex included the Meat Industry Plant. RECP implementation in the Carnex led to annual savings of EUR 410,700, by investing EUR 376,200 and payback time of 11 months. Most options were implemented in Animal Production (farm), where the investment in equipment reduced pollution and wastewater and, simultaneously, a certain amount of organic fertilizer was replaced by manure. By application of the RECP measures, cooling water consumption has been reduced by 40 % and the total energy by 45 %. To produce one kilogram of product, 33 liters of water are consumed. Maximization of the planned production in the meat industry is expected to reduce further the water consumption per pound of product.



Cooling plant, missing insulation on the pipeline and valves



Condensate collector



Elimination of unnecessary water losses

Overview

The Joint Stock Company Carnex Meat Industry Vrbas is a leading food company in Serbia considering the production of meat products. "Carnex" was founded in 1958 in Vrbas. Within a short period, Carnex became the most significant producer of meat and meat products in the Balkans, with a product range including over 100 products. Today, "Carnex" employs about 1,700 workers.

In addition to the meat industry, which annually produces about 17,000 tons of various meat products, four separate business centers operate within "Carnex": BU "Crop Production", with about 4,500 hectares of arable land; BU Zitar, with a silo capacity of 70,000 tons, and the Feed Mill Vitamix, with an annual production of animal feed of about 36,000 tons. The fourth and last Business Center is Animal Production, in which three pig farm operate with a capacity of 62,000 pigs. In this way, "Carnex" is a vertically integrated system with full control of production in all production processes, the so-called - from farm to fork.

Benefits

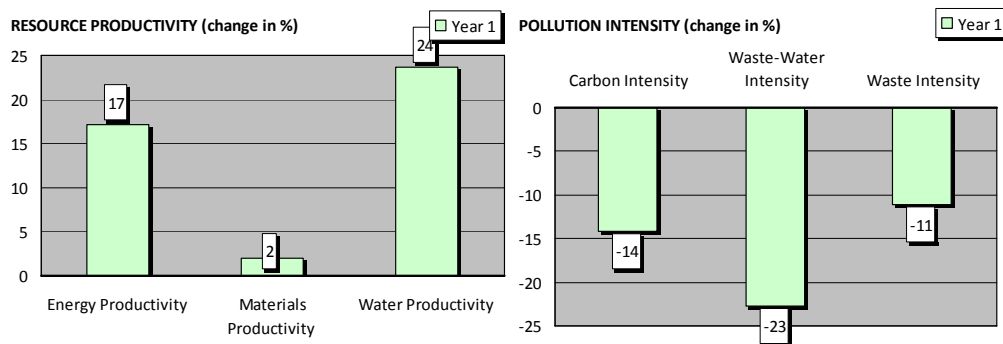
The RECP project was mainly focused on minimizing the consumption of water, steam, electricity, natural gas, raw materials, and waste production, with the aim of determining RECP options. The largest number of the RECP options are related to reduction of

water recirculation water, and procurement of machinery and equipment, which could lead to savings in the preparation of drinking water, reduction of the burden of the facilities for wastewater treatment and sludge operation costs.

Absolute Indicator	Change (%) Year 1	Relative Indicator	Change (%) Year 1
Resource Use		Resource Productivity	
Energy Use	-13	Energy Productivity	17
Materials Use	0	Materials Productivity	2
Water Use	-18	Water Productivity	24
Pollution Generated		Pollution Intensity	
Air emissions (global warming, CO ₂ equivalent)	-13	Carbon Intensity	-14
Waste-water	-21	Waste-water Intensity	-23
Waste	-9	Waste Intensity	-11
Production Output	2		

Other RECP options are related to reducing the consumption of natural gas in different parts of the plant. By thermal insulation of the boilers and hot water and steam piping, and the reconstruction of the existing pipeline for condensate return, large amounts of gas and chemicals, which are used for softening the water for steam production, could be saved. Installation of equipment for compensation of reactive power would also achieve significant savings.

RECP Profile



Resource Efficient and Cleaner Production (RECP)

Resource Efficient and Cleaner Production (RECP) entails the continuous application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment.

RECP addresses three sustainability dimensions individually and synergistically:

- *Production efficiency*

> Through improved productive use of natural resources by enterprises

- *Environmental management*

> Through minimization of the impact on nature by enterprises

- *Human development*

> Through reduction of risks to people and communities from enterprises and supporting their development



Success Areas

The results were achieved through the implementation of the following measures:

- Automatization of the cooling process in autoclaves
- Recirculation of water for process of cooling the heads of compressors
- Elimination of unnecessary water losses by removal of unnecessary water valves
- Reduction of electric power reactive consumption by power factor correction for the transformer station
- Lagging of the condensate reservoir in the boiler room
- Repair and extension of the existing pipeline for return of the steam condensate
- Installation of new meters for water, gas and steam
- Replacement of the drain covers in the plant with new covers having smaller openings and with a lock mechanism
- Purchase of a machine for automatic washing of the trolleys

Principal Options Implemented	Benefits			
	Economic		Resource Use	Pollution generated
	Investment [USD]	Cost Saving [USD/yr]	Reductions in energy use, water use and/or materials use (per annum)	Reductions in waste water, air emissions and/or waste generation (per annum)
OPTION 1. Automatization of the cooling process in autoclaves after the sterilization of the products	65,000	20,000	Reduction of cooling water consumption 25 % ($\approx 44,200 \text{ m}^3$)	
OPTION 2. Automatization of the process for defrosting frozen carcasses	600	6,500	Reduction of defrosting water consumption 50 % ($\approx 15,000 \text{ m}^3$)	
OPTION 3. Recirculation of water for process of cooling the heads of compressors	18,000	90,000	Reduction of cooling water consumption ($\approx 200.000 \text{ m}^3$)	
OPTION 4. Removal of all unnecessary water valves in the plant	/	200		Elimination of unnecessary water losses ($\approx 500 \text{ m}^3/\text{year}$)
OPTION 5. Mounting pistols on the hoses used for washing the plant and installing the spools for laying off the hoses	7,500	6,500	Reduction of daily plant and depot washing water consumption ($\approx 15.000 \text{ m}^3$)	
OPTION 6. Replacement of the drain covers in the plant with new covers having smaller openings and with a lock mechanism	16,000	/		Reduction of organic load of waste water
OPTION 7. Purchase of a machine for automatic washing of the trolleys	25,000	7,000	Reduction of trolley washing water consumption ($10,000 \text{ m}^3$), reduction in the amount of chemicals used for cleaning the plant	
OPTION 8. Power factor correction for the transformer station	23,000	11,000	Reduction of electric power reactive consumption ($3,283,200 \text{ Kvar}$)	
OPTION 9. Lagging of the condensate reservoir in the boiler room	800	2,000	Reduction of gas consumption ($6,500 \text{ m}^3$)	
OPTION 10. Lagging of boiler No. 1 (8 t of steam/hour)	3,000	1,400	Reduction of gas consumption ($4,500 \text{ m}^3$)	
OPTION 11. Lagging of boiler No. 2 (8 t of steam/hour)	3,000	3,000	Reduction of gas consumption ($10,000 \text{ m}^3$)	

OPTION 12. Lagging of boiler No. 3 (12 t of steam/hour)	3,000	12,000	Reduction of gas consumption (40,000 m ³)	
OPTION 13. Lagging of the pipes of the plant for the preparation of hot water	1,300	1,100	Reduction of gas consumption (3,500 m ³)	
OPTION 14. Installation of new meters for water, gas, steam...	10,000	/	Reduction of water, gas and electric power consumption	
OPTION 15. Repair and extension of the existing pipeline for return of the steam condensate	200,000	250,000	Reduction of gas consumption (680,000 m ³), reduction of water usage (≈ 70.000 m ³) and reduction of chemical usage for water preparation	

Approach taken

In order to realize RECP project, "Carnex" signed a contract with the Cleaner Production Centre of Serbia. A team was formed by the CP to implement the project and the Director held an introductory meeting on which all the executives familiar with the objectives of the project were present. Assignments were given to all team members and they were trained in RECP. The assessments made at the beginning of the project were to prepare a material balance, an energy balance and balances of water consumption and wastewater. In developing the proposed RECP options, "Carnex" focused on current problems.

Business case

Most options were implemented in Animal Production (farm), where the investment in equipment reduced pollution and wastewater and, simultaneously, a certain amount of organic fertilizer was replaced by manure. The quality of "Carnex" products among other brands of meat products was confirmed and certified ISO 9001:2000 and HACCP. In addition, "Carnex" has GOST R certification, required for export to the Russian Federation. After this RECP Project, Carnex started application of the project options to the other business centers. Recently, "Carnex" became part of the large MK Group "family", representing the 36th company to join this great business system. The key strategic points in the future business of "Carnex" will be based on increasing the level of production, export growth and launching new products on the market.

Testimony Box
National Cleaner Production Centre (NCPC)
<p>Cleaner Production Centre of Serbia (CPCS) started to work on September 1, 2007 and it is located on the Faculty of Technology and Metallurgy, University of Belgrade as its host-institution. CPCS represents a Faculty department with an Advisory Board, composed of representatives of all stakeholders (government, academia, industry, consulting companies). The Centre, with specialization in resource efficiency, works with number of educated and highly specialized national and international experts on different projects in Serbia and in the Region.</p> <p>The CPCS offers a broad service portfolio, including, amongst others RECP trainings, plant assessments and audit services for companies, water and energy efficiency audits, Ecoprofit projects for municipalities using the RECP methodology, IPPC consulting services etc. The Serbian Cleaner Production Center has worked for over 70 companies (large enterprises and SMEs) from a variety of industrial sectors, has trained more than 60 consultants on RECP methodology and has conducted Ecoprofit Projects with two Municipalities. Furthermore, since 2010, the Centre's representatives have also been working as experts in resource efficiency and cleaner production of the International Finance Corporation (IFC) on projects in Serbia, Russia, Croatia, Bosnia and Herzegovina, Ukraine and Kazakhstan. The CPCS works with the support of the Ministry of Environment and Serbian Chamber of Commerce and has good cooperation with different organisations, academia, consulting companies etc.</p>
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English Abstract (where applicable)

ABOUT RECP EXPERIENCES

Through the joint Resource Efficient and Cleaner Production (RECP) Programme, the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP) cooperate to improve the resource productivity and environmental performance of businesses and other organizations in developing and transition countries. The Programme is implemented in partnership with the Global Network for Resource Efficient and Cleaner Production (RECPnet). This series of enterprise success stories documents the resource productivity, environmental and other benefits achieved by enterprises in developing and transition countries through the implementation of RECP methods and practices.

These successes were achieved with the assistance of the National Cleaner Production Centres, which are part of RECPnet established with support of the UNIDO and UNEP. The success stories employ the indicator set described in *Enterprise Level Indicators for Resource Productivity and Pollution Intensity*, UNIDO/UNEP, 2010. The primer with accompanying calculator tool and further case studies are available at www.recenet.org, as well as on www.unido.org/cp and www.unep.fr/scp/cp.